HERPETOFAUNA SURVEY OF MARALLA ROAD BUSHLAND

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ABSTRACT

A 20 hectare strip of bushland adjacent to Maralla Road on the northern edge of 641 ha known as Maralla Road Bushland yielded 9 frog and 36 reptile species. This represents the highest herpetofaunal diversity recorded for a single area on the Swan Coastal Plain near Perth. Several species including *Strophurus spinigerus* and *Ctenotus gemmula* were recorded near the edge of their distributions. The pristine condition and size of this bushland remnant together with the diversity and species richness of the herpetofauna, indicates the high regional conservation significance of the area.

INTRODUCTION

The study area is located in the City of Swan near Bullsbrook (31°40'S, 116°02'E) and is approximately 30km north-east of Perth. For some time now the region has been targeted for regional housing development and road construction schemes. This survey was primarily initiated to improve the herpetofaunal knowledge of this poorly known area. Detailed vegetation and flora surveys have been compiled by Dames and Moore (1990 and 1992) and Weston *et al.* (1993) and limited faunal surveys by Watkins *et al.* (1993). The Ellenbrook Conservation Group approached the Western Australian Society of Amateur Herpetologists (WASAH) to conduct a preliminary herpetofauna survey in 1992. WASAH has played a leading role in documenting herpetofauna of metropolitan bushland areas. With this in mind, it is encouraging to recognise the government's interest and commitment to the preservation of urban bushlands such as Maralla Road, as expressed in '*Perth's Bushplan* (Government of Western Australia 1998) and 'Bush Forever' (Government of Western Australia 2000). The public support for this initiative is demonstrated by the creation of numerous 'Friends of' groups, including that of the area surveyed here.

METHODS

A large part of the greater Maralla Road Bushland area has limited access. We therefore decided to sample the different vegetation communities in a 500 metre strip adjacent to the southern edge of Maralla Road by installing traplines and by hand searching. Maralla Road Bushland is primarily a *Banksia* spp. woodland habitat with heavily leached grey or white siliceous sands, typical of the Bassendean Dune System. Its eastern margin encroaching upon the alluvial soils of loam or clay of the Pinjarra Plain (How and Dell, 1994). Amphibians and reptiles were collected, identified and released during six months of 1992 to early 1993 (Feb-Mar, Sept-Jan) and during spring-summer period of 1999– 2000 (Oct-Apr) respectively. In addition some voucher specimens were lodged with the Western Australian Museum to verify identifications and for tissue sampling as part of taxonomic studies. Five drift fences each measuring 50–70 metres with 7–10 pit-traps were installed to sample the different habitats parallel to Maralla Road. Selection of pit-trap sites reflected differences in vegetation structure from a *Banksia* dominated woodland on a dune crest to a lowland community of *Melaleuca* and *Xanthorrhoea* in a west to east alignment towards the Darling Scarp. The traps were operated for a total of 7093 trap nights. Apart from trapping, we also opportunistically foraged near traplines during the day time by turning over surface debris, raking through leaflitter and observing, as well as headtorching at night for nocturnal species. General vegetation descriptions at each trapline were:

TRAPLINE 1 (31°44'33", 115°58'57")
Dune crest, *Banksia attenuata* low woodland with sparse *Eucalyptus todtiana, E. calophylla* and *Adenanthos cygnorum* over mixed relatively open understorey consisting of dominants such as *Verticordia nitens, Stirlingia* sp. and *Calytrix* sp.

TRAPLINE 2 (31°44'33", 115°59'06")
Dune slope, *Banksia attenuata* low woodland with sparse *B. ilicifolia* and *E. todtiana* over dense understorey.

TRAPLINE 3 (31°44'33", 115°59'20")
Ecotone, very open *B. attenuata* and *B. ilicifolia* low woodland with emergent *A. cygnorum* over sparse understorey dominated by *Melaleuca* sp. and *Patersonia* sp.

TRAPLINE 4 (31°44'32", 115°59'21")
Lowland, sparse *E. calophylla* and *Melaleuca preissiana* over *Xanthorrhoea preissii* and *Patersonia* sp. understorey.

TRAPLINE 5 (31°44'32", 116°00'03")
Lowland, open *Acacia cyclops* with scattered *Jacksonia* sp., *Viminaria juncea, X. preissii* and *M. preissiana* over a sedge understorey.

Nomenclature for frogs follows Tyler *et al.* (2000) and for reptiles follows Greer (1989 and 1997).

RESULTS AND DISCUSSION

The area supports a rich assemblage of herpetofauna. Indeed, the 9 frog and 36 reptile species recorded to date exceeds any previous survey on the Swan Coastal Plain near Perth (Storr *et al.*, 1978; Browne-Cooper *et al.*, 1989; How and Dell, 1990; Maryan, 1993). Trapline 3 was the most diverse site with 32 species. This is probably due to its ecotonal location on the boundaries of two habitats between the *Banksia*

woodlands and the lower-lying habitats dominated by *Acacia, Melaleuca* and *Xanthorrhoea*. This site was noticeable for its sparse understorey and deeper sand. Not surprisingly, frogs were more prevalent in the low-lying habitats where there is less drainage. *Heleioporus eyrei* was common at all sites while the essentially terrestrial *Myobatrachus gouldii* was recorded more frequently on the dune crest. The pygopods *Aprasia repens* and *Lialis burtonis*, agamid *R. adelaidensis*, scincids *Ctenotus australis*, *C. fallens*, *Lerista elegans*, *Menetia greyii* and fossorial elapids *Neelaps calonotos* and *Simoselaps bertholdi* were more abundant at Traplines 1 and 3 where there was deeper sand. The number of *Rankinia adelaidensis* trapped on the dune crest was the most for any species recorded at any site. *Pletholax gracilis* was noticeably more common in the ecotone with sparse understorey. The large elapids *Notechis scutatus* and *Pseudonaja affinis* were observed more frequently in the lower-lying areas, where dampness and an abundance of frogs probably suited the former, and the adjoining cleared agistment areas the latter. Comparatively, the diversity at Maralla Road Bushland is close to the 43 species recorded in Yanchep National Park with a total of 2800 ha. (Burbidge and Rolfe unpubl. report). Yet the area sampled here represents only a small part of Maralla Road Bushland, and is less diverse in habitats then Yanchep National Park. The herpetofaunal diversity in Yanchep National Park is undoubtedly enhanced by having coastal vegetation communities, limestone rock formations and Tuart woodlands within its boundaries. These communities support *Crenadactylus ocellatus, Diplodactylus alboguttatus, Underwoodisaurus milii, Adys concinna, Cyclodomorphus celatus, Egernia kingii, Lerista lineopunctulata* and *Morelia spilota imbricata*, all of which appear to be absent from the Maralla Road Bushland due to either its inland locality, soil and/or vegetation structure. Herpetofaunal diversity at Maralla Road Bushland is probably a direct reflection of both its size and the minimal degradation and human traffic at the site. How and Dell (1994) provide a detailed zoogeographic analysis of 22 sites within the Perth metropolitan region including the area surveyed here. Their analysis further illustrates that larger areas generally maintain larger herpetofauna assemblages. However, the importance in conserving even small remnant areas of suburban bushland especially for small lizard assemblages, is highlighted by the results of Turpin (1990, 1991) and Cooper (1995). Due to the survey area representing only about 1% of the total area of Maralla Road Bushland, and also considering that our survey effort was seasonal, it is reasonable to predict that additional species will be recorded. This assumption is supported by database and literature searches in the Western Australian Museum and by personal observations, that record a further nine species near this area on the coastal plain. They are: *Crenadactylus ocellatus* – Ellenbrook Nature Reserve, *Pygopus lepidopodus* – Melaleuca Park/Whiteman Park/Muchea, *Varanus rosenbergi* – Whiteman Park/West Swan (unconfirmed sightings made by Lyn Dunstan at her residence on Maralla Road), *Ramphotyphlops waitii* – Bullsbrook/Upper Swan (recorded as a roadkill nearby during survey), *Elapognathus coronatus* – Muchea, *Echiopsis curta* – Bullsbrook/Muchea, *Neelaps bimaculatus* – Melaleuca Park/Bullsbrook, *Parasuta nigriceps* – Whiteman Park and *Pseudechis australis* – Bullsbrook/Upper Swan (a large elapid was observed near Trapline 3 during

Table I. The total number of individuals pit-trapped at each site: an X denotes observation only.

Species	Traplines				
	1	2	3	4	5
MYOBATRACHIDAE – Ground Frogs					
Crinia georgiana	1		14	38	
Crinia glauerti				X	X
Crinia insignifera	1		4	18	5
Heleioporus eyrei	53	21	50	49	10
Limnodynastes dorsalis	2		2	1	
Myobatrachus gouldii	9	1	3	1	X
Pseudophryne guentheri			7	7	X
HYLIDAE – Tree Frogs					
Litoria adelaidensis				1	X
Litoria moorei					X
CHELUIDAE – Turtles					
Chelodina oblonga					X
GEKKONIDAE – Geckos					
Christinus marmoratus	X				
Strophurus spinigerus	4		2	X	X
PYGOPODIDAE – Legless Lizards					
Aprasia repens	14	3	7	3	3
Delma fraseri	X	1			
Delma grayii			1	1	
Lialis burtonis	18	7	16	9	5
Pletholax gracilis	6	4	23	5	1
AGAMIDAE – Dragons					
Pogona minor	9	4	4	5	
Rankinia adelaidensis	74	1	19	2	
SCINCIDAE – Skinks					
Acritoscincus trilineatum			4	5	X
Cryptoblepharus plagiocephalus	12	1	5	3	X
Ctenotus australis	5	X	13	X	
Ctenotus fallens	3	8	30	15	4
Ctenotus gemmula			1	1	
Ctenotus impar		1			
Egernia napoleonis				1	X
Hemiergis quadrilineata	3	8	17	11	6
Lerista christinae			2	7	
Lerista elegans	37	19	32	19	X
Lerista praepedita	10	1	5	10	
Menetia greyii	25	7	22	5	7
Morethia lineoocellata	2	1	4	2	

Table 1 (cont.)

Species	Traplines 1	2	3	4	5
Morethia obscura	1	1	10	7	1
Tiliqua occipitalis			2	1	1
Tiliqua rugosa	2	1	2	6	X
VARANIDAE – Monitors					
Varanus gouldii				X	X
Varanus tristis	1				
TYPHLOPIDAE – Blind Snakes					
Ramphotyphlops australis	4		4	6	1
ELAPIDAE – Front Fanged Snakes					
Brachyurophis fasciolata	1				
Brachyurophis semifasciata	2	X			
Neelaps calonotos	4		3	1	1
Notechis scutatus			2	X	1
Parasuta gouldii	2	1	X	X	
Pseudonaja affinis	1			X	X
Simoselaps bertholdi	4	X	5		X
Total number of species	29	19	32	29	13

survey and was tentatively identified as this species). The Maralla Road Bushland supports all 9 species of frogs that are widespread on the Swan Coastal Plain. Only one of these, *Crinia insignifera*, is endemic to the coastal plain between Gingin and Busselton (Tyler *et al.*, 2000). Two further myobatrachid frogs *Heleioporus barycragus* and *Neobatrachus pelobatoides* have been recorded nearby at Ellenbrook Nature Reserve, but are omitted from the list of likely additional species due to the lack of clay or loam soils in the Maralla Road Bushland. Ellenbrook Nature Reserve is well known for its population of the critically endangered Western Swamp Turtle *Pseudemydura umbrina*. Despite its close proximity to the survey area the turtle seems unlikely to naturally occur on Maralla Road Bushland, as the swamp systems are inadequate for this species (G. Kuchling pers. comm.). To date, searches in likely areas for *P. umbrina* have only revealed the presence of the more common and widespread *Chelodina oblonga*. Only two species of gecko were recorded in the survey area. Generally with this group, diversity is low in the more cooler southerly regions (Storr *et al.*, 1990). It is interesting to note the presence of what appears to be two subspecies *Strophurus spinigerus spinigerus* and *Strophurus spinigerus inornatus* in the survey area. Storr (1988), stated the gap separating these two forms as being only a few kilometres between the top and bottom of the Darling Scarp. The dominant form in the survey area is the plain-backed *inornatus*, which is more prevalent in the Darling Range (pers. obs.), while the more ornate nominate *spinigerus*

form is predominantly coastal. This situation warrants further investigation from a taxonomic perspective. Legless lizards are well represented in the survey area with five of the eight regionally occurring species recorded. *Pygopus lepidopodus* is also likely to occur because it is recorded in both Whiteman and Melaleuca Parks. *Pletholax gracilis* is dependent on *Banksia-Eucalyptus* woodlands or heaths on sandy soils (Wilson and Knowles, 1988). This habitat is locally reduced and has lead to a decline in the species range in the Perth region (Shea and Peterson, 1993). Based on his capture rates at two sites (Bamford, 1998) speculated that *P. gracilis* was more trappable in pitfall traps in areas of sparse understorey. This could possibly be the case at Maralla Road Bushland where the ecotone site produced more captures. By contrast, at Modong Nature Reserve in Oakford, *P. gracilis* was more frequently trapped in *Melaleuca preissiana* low woodland over a very dense heath understorey (pers. obs.). The skink lizards are the most diverse and abundant reptiles in the survey area. The area yielded all four *Ctenotus* spp. known from the coastal plain around Perth. This has only been previously replicated at Whiteman Park (How and Dell, 1994). One of these species, *C. gemmula*, is infrequently recorded on the coastal plain, but occurs in disjunct populations north to Cataby (Storr *et al.*, 1999). Indeed, the type locality for this species is South Perth, where all of its former habitat has been destroyed by urban development. *Ctenotus impar* is rarely recorded on the coastal plain north of the Swan River (Storr *et al.*, 1978). The distribution of the burrowing skink *Lerista christinae* was extended south into the Perth metropolitan area as a result of this survey, although it also occurs on Rottnest Island. Apart from this extension of range all other reptiles listed are within their known range and most are widely distributed throughout the south west. Three species of monitor lizard occur in the Perth region (Bush *et al.*, 1995). Although *Varanus rosenbergi* is unconfirmed from the area it is highly likely to occur based on nearby records, particularly in Whiteman Park. Therefore it is probable that Maralla Road Bushland supports all three species. It is also worth mentioning the presence of four species of burrowing snake in the survey area. On the coastal plain, only Bold Park has yielded all five species in sympatry over a prolonged period of trapping (How and Dell, 1994). The one species unrecorded from the Maralla Road Bushland, *Neelaps bimaculatus*, is expected to occur owing to nearby records and its broader distribution on both the coastal plain and Darling Range (Bush *et al.*, 1995). *Neelaps calonotos* is almost entirely endemic to the Swan Coastal Plain near Perth. The 9 frogs and 36 reptiles recorded represent approximately 50% of the 16 frog species, 51 lizards and 20 terrestrial snakes naturally occurring in the Perth region (Bush *et al.*, 1995). This diversity is a direct reflection of the size and near pristine condition of the *Banksia* woodlands and other environments. The importance of this diversity becomes even more apparent, when considering that only 7% of *Banksia* woodlands are protected in conservation reserves on the Swan Coastal Plain (Hopper and Burbidge, 1989). The zoogeographic location of Maralla Road Bushland on the Swan Coastal Plain significantly straddles a major change-over zone, from the sandy Bassendean soils to the heavier fluviatile soils of the eastern side of the plain. Any future development projects that involve large scale alterations and/

or fragmentation to Maralla Road Bushland will undoubtedly lead to impoverishment in all Biodiversity aspects and critical loss in areas of potential tourism, environmental education and scientific uses.

CONSERVATION CONSIDERATIONS

Maralla Road Bushland is currently privately owned but is listed for Parks and Recreation under the Metropolitan Region Scheme. (Government of Western Australia 2000). Maralla Road Bushland has been the subject of a detailed Public Environmental Review process involving the proponents Homeswest, Sanwa Vines Pty. Ltd. and Mt Lawley Pty. Ltd. (Environmental Protection Authority, 1992). This report to the Minister for the Environment suggested that only 90 hectares of the area, the proponents preferred conservation option, be set aside for Parks, Recreation and Conservation, and regrettably contained the erroneous statement that "much of the land has been totally modified". This is very misleading, as apart from some meagre selective harvesting of native timber and barely noticeable weed invasion, the 950 ha is in excellent condition. In-fact, the excellent/pristine condition, large size and diversity of vegetation associations in a bushland setting so close to Perth are unique (Urban Bushland Council, 1997). This view was overwhelmingly reflected in the majority of public submissions supporting the exclusion of the entire area from urban development. The EPA considered the protection of approximately 641 hectares including all significant wetlands, as their environmentally acceptable option. In addition to this, further likely disturbance include plans for regional road requirements by the Main Roads Department, as well as identification of a general mineral resource area for clay and sand. More recently, the future of Maralla Road Bushland has become more promising with recognition of the area's conservation significance in 'Perth's Bushplan (Government of Western Australia 1998) and finally in Bush Forever (Government of Western Australia 2000). Currently, Maralla Road Bushland is reserved for Parks and Recreation in the Metropolitan Region Scheme. We fully endorse the recommendation made by 'Perth's Bushplan' that Maralla Road Bushland be set aside as a National Park or Nature Reserve. Other bushland areas in close proximity such as Melaleuca/Whiteman Parks and Twin Swamps/Ellenbrook Nature Reserves are set aside for the conservation of flora and fauna and managed by the Department of Conservation and Land Management, the latter primarily for the preservation of the critically endangered *P. umbrina*.

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